Multi-Hazard Mitigation Plan

5.0 Mitigation Strategy

The CPT reviewed and discussed the process of formulating mitigation goals. Each CPT member was provided with a written explanation of Goals and Objectives, the purposes they serve, and how they are developed and written. Up to this point in the planning process, the CPT has been involved in talking to agencies and organizations and collecting and recording hazard related data. From these discussions and efforts, the CPT completed all three components of the Risk Assessment:

1. Hazard Identification;
2. Vulnerability Assessment; and
3. Capability Assessment.

The first two components have painted a picture of the vulnerability of Metropolitan Nashville - Davidson County to natural hazards. The CPT learned that:

1. Stream system and neighborhood flooding continues to be a significant threat to the community;
2. Geological hazards including landslides and sinkholes are a moderate threat;
3. Earthquakes pose a potential threat; and
4. Most meteorological and natural biological hazards occur periodically: drought, extreme temperatures, infestations, severe thunderstorms/high wind, tornadoes, and severe winter storms.

The third component, Capability Assessment, described the current ability of Metro to counter the identified threats through existing policies, regulations, programs, and procedures. Here, the CPT learned that:

1. Flood insurance is available, although only 2,785 policies are in effect, representing 35 percent of the 10,000 building footprints located within the floodplain;

2. Metro has an existing Floodplain Management Plan for Repetitive Loss Areas;

3. The Stormwater Regulation Review Committee (SWR2C) is reviewing and formulating recommendations for stormwater regulations;

4. MWS has prioritized Capital Improvement Projects as outlined in the multiple Watershed Basin Plans;

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5. MWS has prioritized watersheds throughout the County for preparing/updating Basin Plans;

6. The IRC Building Codes contain seismic and design wind elements;

7. Residential plan reviews are performed on complex designs;

8. The NPDES water quality requirements may offer an opportunity to coordinate flood warning capabilities and stream gauging;

9. OEM has recently updated the severe weather warning siren capabilities of the community with 70 sirens;

10. Metro has an existing program in place to upgrade the protection of sewage treatment facilities;

11. Public information could be made available to inform residents about the risks of hazards (earthquakes, floods, and tornadoes, predominantly) and appropriate risk reduction actions that they can undertake; and

12. Metro does not support flood protection and retrofitting as standard solutions for residential flooding problems.

GOAL SETTING

The analysis of the three components of the Risk Assessment identified areas where mitigation improvements could be made, providing the framework for the CPT to formulate planning goals. Each CPT member was provided an alphabetized list of possible goal statements. In addition, each CPT member also received a list of goals from other community plans that have had public input and review and have already been formally adopted by Metro. This information was provided to CPT to ensure that the Mitigation Planning Goals would be in concert, not in conflict, with other existing community priorities. CPT members then each received three index cards and were asked to write what they felt would be appropriate goals for this plan using the information provided as a guide.

The CPT members were instructed that they could use, combine or revise the statements provided, or develop new ones. The goal statements were then attached to the meeting-room wall, grouped into similar topics, combined, rewritten, and agreed upon.

Some of the statements were determined to be better suited as objectives or actual mitigation projects, and were set aside for later use. Based upon the planning data review, and the process described above, the CPT developed the final goal statements listed below. None of the final goal statements are the same as those provided on the alphabetized list. The goals and objectives provide the direction for reducing future hazard-related losses in Metropolitan Nashville - Davidson County.

GOAL #1: **Reduce exposure to hazard related losses for existing and future development.**

Objective 1.1: *Strengthen the existing flood hazard mitigation program.*

Objective 1.2: *Protect critical facilities, utilities, and infrastructure.*

Objective 1.3: *Improve the coordination of severe weather mitigation actions.*

Objective1.4: *Develop a coordinated set of mitigation actions that address geological hazards (earthquakes, sinkholes, and landslides).*

GOAL #2: **Promote awareness of hazards and vulnerability among citizens, business, industry and government.**

Objective 2.1: *Develop a seasonal multi-hazard public education campaign to be implemented annually.*

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GOAL #3: Maximize use of available funding.

Objective 3.1: Identify multiple objective opportunities that can be used to support mitigation activities.

Objective 3.2: Identify and analyze project cost share options.

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Objective 3.3: Submit mitigation project applications annually at a minimum.

IDENTIFICATION OF MITIGATION MEASURES

Following the goal setting meeting, the CPT conducted a brainstorming session to generate a set of viable alternatives that would support the selected goals. Each CPT member was provided with the following list of categories of mitigation measures:

- Prevention;
- Property Protection;
- Structural Projects;
- Natural Resource Protection;
- Emergency Services; and
- Public Information.

Potential mitigation measures, within each of the six categories, were presented to the CPT. A facilitated discussion examined and analyzed the alternatives. Then, with an understanding of the alternatives, the CPT generated a list of preferred mitigation actions to be recommended. Similar to the goal-setting activity, the CPT included all previously recommended mitigation actions from existing Metro mitigation plans in its review. This process reinforced Metro's use of the Multi-Hazard Mitigation Plan as an umbrella document for all exiting mitigation plans mentioned in Section 3. Thus, this plan puts forth existing recommendations that are still to be implemented in addition to the new recommendations that resulted from the CPT's detailed Risk Assessment process. This plan serves as an update to the existing mitigation plans by identifying the recommendations from previous plans that have already been implemented and by reprioritizing those that remain.

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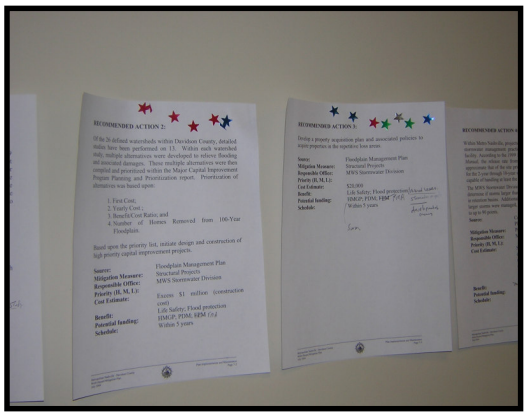
Once the old and new mitigation actions were identified, the CPT members were provided with decision-making criteria to prioritize the recommended actions. FEMA's recommended "STAPLE/E" criteria set (social, technical, administrative, political, legal, economic, and environmental criteria) was utilized in order to help decide why one recommended action might be more important, more effective, or more likely to be implemented than another.

With these tools, the CPT then undertook an exercise to prioritize the recommended mitigation measures. CPT members were provided with colored "stars" – 3 red, 3 blue, and 3 green. Each color represented either high, medium, or low priority with regard to the importance, and each color was assigned a corresponding value (high = 5 points, medium = 3 points, and low = 1 point).



Priority "Stars"

CPT members then voted for their preferred mitigation measures by placing their "stars" on specific mitigation measures. Team members were allowed to place as many as they wished of any or all colors on any one recommendation or to spread the stars among multiple mitigation actions. They were allowed to trade "stars", or otherwise negotiate with any other Team member, and they did not have to

use all of their "stars" if they did not wish to do so. This process provided both consensus and priority for the CPT recommendations.

THE MITIGATION STRATEGY

The results of the planning process, the Risk Assessment, the Goal Setting, the Identification of Mitigation Measures, and the hard work of the CPT led to the Action Plan presented herein. It also helped the CPT clearly comprehend and identify the overall mitigation strategy that will lead to the implementation of the Action Plan.

All of the recommendations set forth fall into four easily identifiable strategies:

- ENFORCE existing rules, regulations, policies and procedures. Communities can reduce future losses not only by pursuing new programs and projects, but also by paying closer attention to what's already "on the books."

- EDUCATE the community on the hazard information that Metro has collected and analyzed through this planning process so that the community understands what disasters can happen, where disasters might occur, and what they can do to prepare themselves better. As part of public education, publicize the "success stories" that are achieved through the CPT's ongoing efforts;

- IMPLEMENT the Action Plan, much of which is comprised of reiterating recommendations that have previously been made as a result of existing community plans;

- MOM --- ardently monitor "Multi-Objective Management" opportunities, so that funding opportunities may be shared and "packaged" and broader constituent support may be garnered.

ACTION PLAN

The Action Plan presents the prioritized recommendations for Metro to pursue in order to lessen the vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. The recommendations are presented in order of priority to the community both in terms of need and effectiveness. The recommendations are also listed under the corresponding developed goal. Each recommendation includes a cost estimate and community benefit to meet the regulatory requirements of DMA. Recommendations that have already been completed are included at the end of this section.

GOAL #1: **Reduce exposure to hazard related losses for existing and future development.**

Objective 1.1: *Strengthen the existing flood hazard mitigation program.*
Objective 1.2: *Protect critical facilities, utilities, and infrastructure.*
Objective 1.3: *Improve the coordination of severe weather mitigation actions.*
Objective 1.4: *Develop a coordinated set of mitigation actions that address geological hazards (earthquakes, sinkholes, and landslides).*

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RECOMMENDED ACTION 1:

Of the 26 defined watersheds within Davidson County, detailed studies have been performed on 13. Within each watershed study, multiple alternatives were developed to relieve flooding and associated damages. These multiple alternatives were then compiled and prioritized within the Major Capital Improvement Program Planning and Prioritization report. Prioritization of alternatives was based upon:

1. First Cost;
2. Yearly Cost ;
3. Benefit/Cost Ratio; and
4. Number of Homes Removed from 100-Year Floodplain.

Based upon the priority list, the action plan recommends that Metro initiate design and construction of high priority capital improvement projects.

Source:	Floodplain Management Plan
Mitigation Category:	Structural Projects
Responsible Office:	MWS Stormwater Division
Priority (H, M, L):	High
Cost Estimate:	Excess $1 million (construction cost)
Community Benefit:	Life Safety; Flood protection
Potential funding:	HMGP; PDM; FMA
Schedule:	Within 5 years

RECOMMENDED ACTION 2:

Communities often prohibit critical facilities or hazardous uses from the floodway or the entire floodplain. While a building may be considered protected from the 100-year flood, a higher flood or an error on the builder's or operator's part could result in a greater risk than the community is willing to accept. If a critical facility must be located in a floodplain, then it should be designed to stringent protection standards and have flood evacuation plans. Metro does not currently have any special provisions for critical facilities.

The CPT recommends that ordinance language to provide added protection for critical facilities and prohibit hazardous materials and public health hazards from the floodplain is drafted, circulated for review and adopted.

Source:	Community Rating System Action Plan
Mitigation Category:	Prevention
Responsible Office:	MWS; Metro Planning; Metro Codes
Priority (H, M, L):	High
Cost Estimate:	Staff Time; Five to ten days of staff time to get the regulation adopted. Enforcing the new standard would be part of ongoing permit enforcement work.
Community Benefit:	Critical facility protection
Potential funding:	Existing Budget
Schedule:	Within 2 years

RECOMMENDED ACTION 3:

A community flood response plan must specify steps to be implemented when a flood warning is issued, such as when and which streets to close, when to order an evacuation, when and what equipment should be moved to high ground, etc. (Generic response procedures are not credited under the CRS program. A prerequisite for CRS credit is that the community must receive flood threat recognition system and emergency warning dissemination credit).

The Mayor's Office of Emergency Management should review the costs and benefits of preparing a detailed flood response plan that identifies specific actions to take at different flood level predictions.

Source:	Community Rating System Action Plan
Mitigation Category:	Emergency Services
Responsible Office:	OEM
Priority (H, M, L):	High
Cost Estimate:	$25,000 or less
Community Benefit:	Effective, coordinated response, reducing losses, eliminating gaps and duplications in response activities
Potential funding:	FMA, HMGP, existing budgets
Schedule:	Within 3 years

RECOMMENDED ACTION 4:

Metro Nashville's Special Flood Hazard Areas include 107.9 river miles of approximate A Zones, where FEMA did not provide base flood elevations. Most of these areas are slated for studies that will provide flood elevations and floodways.

The studies underway in the approximate A Zones should be completed and adopted into Metro's floodplain regulations. The studies should then be submitted to FEMA with a request to revise the FIRM.

Source:	Community Rating System Action Plan
Mitigation Category:	Property Protection
Responsible Office:	MWS Stormwater Division
Priority (H, M, L):	Medium
Cost Estimate:	Approximately $1,500 per river mile of each approximate A Zone
Community Benefit:	Life Safety; Regulating development to a defined flood elevation
Potential funding:	CTP; HGMP; PDM; USACE
Schedule:	Within 5 years

RECOMMENDED ACTION 5:

Develop a property acquisition plan and associated policies to acquire properties in the repetitive loss areas.

Source:	Floodplain Management Plan
Mitigation Category:	Structural Projects
Responsible Office:	MWS Stormwater Division
Priority (H, M, L):	Medium
Cost Estimate:	$20,000
Community Benefit:	Life Safety; Flood protection; Reduced losses; Development of greenway; stormwater management
Potential funding:	HMGP; PDM; FMA
Schedule:	Within 5 years

RECOMMENDED ACTION 6:

OEM has installed and continually updates a software program (E-Stat) that provides contact information and the geographical location of the following facilities within the Metro area: Title III facilities, critical facilities, and service facilities such as Metro ECC, Metro Fire Stations, NES, MWS facilities, Metro Police precinct stations, hospitals, nursing homes, schools, and daycares.

WebEOC is a software program with required associated hardware, LCD Panels and projectors. WebEOC will provide emergency management checklists during EOC activation. It will also provide real time multi-media with plotted incident sites and damage / impact areas based on Computer Aided Dispatch (CAD) data and field reports.

Fund, acquire, and install appropriate hardware and software.

Source:	OEM Local Hazard Mitigation Plan
Mitigation Category:	Prevention – Loss estimation tools, what-if modeling
Responsible Office:	OEM
Priority (H, M, L):	Medium
Cost Estimate:	Approximately $25,000
Community Benefit:	Modeling would allow fit-gap analysis to determine optimum solutions; maximize efficiency in response and recovery activities; forecast and prioritize problem areas
Potential funding:	Public-Private partnerships
Schedule:	2005

RECOMMENDED ACTION 7:

CRS credit is provided for enforcing regulations that prohibit dumping in streams and other portions of the drainage system. The regulation must meet three prerequisites:

- A prohibition of dumping ANY material in a channel or basin that could cause an obstruction to flows. Ordinances prohibiting pollutants or causing nuisances are not sufficient by themselves;
- The identification of an officer or office responsible for enforcement and monitoring compliance; and
- Provisions for penalties and abatement of violations.

The Metro Department of Law should draft stream dumping regulations that would qualify for CRS credit.

Source:	Community Rating System Action Plan
Mitigation Category:	Prevention; Natural and Beneficial Functions
Responsible Office:	MWS Stormwater Division; Metro Department of Law
Priority (H, M, L):	Medium
Cost Estimate:	Two to three days for developing the ordinance and procedures. The cost of enforcing the regulations is not included here, as that would be dependent on the number of violators.
Community Benefit:	Maintaining a stormwater drainage system that operates at design capacity
Potential funding:	Existing Budget
Schedule:	Within 5 years

RECOMMENDED ACTION 8:

Metro Nashville's emergency management program, in conjunction with Public Works, has installed several flood-warning gages in some county streams and creeks. The coverage of these gages is for only 3 of the county's 14 repetitive flooding creeks and streams.

An additional 11 gages are recommended for total coverage of the community.

Source:	OEM Local Hazard Mitigation Plan
Mitigation Category:	Emergency Services
Responsible Office:	OEM
Priority (H, M, L):	Medium
Cost Estimate:	$10,000 - $15,000 annual maintenance
Community Benefit:	Improved warning, increased lead time on warning systems and mitigation efforts, reduced losses, life safety
Potential funding:	Coordinate with NPDES gauging needs where possible; USGS
Schedule:	Within 5 years

RECOMMENDED ACTION 9:

The MWS Stormwater Division's drainage maintenance section currently removes debris and obstructions in response to complaints and reports of problems. Although staff is increasing, there are not enough people to inspect the entire drainage system once a year. There is also no written set of procedures that would meet the CRS documentation requirements.

The MWS Stormwater Division should review the costs and benefits of formalizing Metro's inspection and maintenance program to include detention facilities as well as streams and ditches. In addition, written procedures will enable the program to qualify for additional CRS credit.

Source:	Community Rating System Action Plan
Mitigation Category:	Property Protection
Responsible Office:	MWS Stormwater Division
Priority (H, M, L):	Medium
Cost Estimate:	The entire drainage system would need to be mapped, streams and basins deserving of annual inspections and maintenance would need to be identified, and procedures that meet the CRS criteria would need to be written and approved. Five (5) days of staff time. Because the drainage maintenance section is moving toward formal inspections, the cost of doing the inspections and maintenance are not considered an extra cost of receiving CRS credit. The total cost of removing small obstructions found by more frequent inspections before causing a problem would be less than removing large obstructions later.

Community Benefit:	Life Safety; Property Protection; Pro-active approach to flood mitigation; FEMA eligibility
Potential funding:	Existing Budget
Schedule:	Within 5 years

RECOMMENDED ACTION 10:

The CPT determined that geological hazards were adequately prevented in subdivision development through the designation of critical lots. Lots are designated critical during the preliminary plat review process based on soil conditions, degree of slope or other lot features, and to address concerns in relation to the feasibility of construction. In order to determine the best method for addressing geological hazards, it is recommended that geological hazard ordinances from communities similar to Metro be identified, collected, and reviewed as part of the process of modifying the critical lot concept. However, outside of subdivision development, the critical lot concept is not utilized.

It is recommended that the definition of a critical lot be expanded to include specific geological details and defined subjectively during plat review and that the critical lot concept be used in review of other developments.

Source:	Community Planning Team
Mitigation Category:	Prevention
Responsible Office:	MWS Stormwater Division; Metro Codes
Priority (H, M, L):	Medium
Cost Estimate:	Staff Time
Community Benefit:	Life Safety
Potential funding:	Existing Budget
Schedule:	Within 3 years

RECOMMENDED ACTION 11:

CRS credit is provided for the following regulatory standards:

- **Foundation protection:** Flood and erosion requirements can protect buildings on fill against differential settling as well as scour and erosion.
- **Cumulative substantial improvements:** The NFIP allows improvements valued at up to 50% of the building's pre-improvement value to be permitted without meeting the flood protection requirements. Over the years, a community may issue a succession of permits for different repairs or improvements to the same structures. This can greatly increase the building's overall flood damage potential.
- **Compensatory storage:** Buildings built on fill and elevated above the base flood elevation meet the NFIP rules. However, when fill or buildings are placed in the floodplain, the flood storage areas are lost and flood heights will go up because there

is less room for the floodwaters. This is particularly important in smaller watersheds which respond sooner to changes in the topography.

- **Protecting shorelines:** The CRS credits regulations that require new floodplain developments to avoid or minimize disruption to shorelines, stream channels, and their banks.
- **Low density zoning:** The fewer structures built in the floodplain, the better, so the CRS provides credit for zoning areas to keep them substantially open. This credit is available for undeveloped land within low density zoning districts, as well as for areas developed in accordance with the density requirements. For this element, it does not matter why an area is zoned for low density; what counts is the minimum lot size allowed in the zoning district.

In order for Metro to receive credit, existing permit procedures should be reviewed or revised, as needed, to ensure that the provisions of the ordinances are fully implemented. In addition, permit records should be reviewed to verify that Metro can document enforcement of all the creditable elements under CRS.

Source: Community Rating System Action Plan
Mitigation Category: Prevention
Responsible Office: MWS Stormwater Division; Metro Codes
Priority (H, M, L): Medium
Cost Estimate: Staff Time
Community Benefit: Life Safety
Potential funding: Existing Budget
Schedule: 2005

RECOMMENDED ACTION 12:

Drainage Maintenance staff should make site visits in response to complaints or inquiries from property owners. Staff should be trained in retrofitting techniques and be comfortable providing retrofitting guidance during site visits.

Source: Community Rating System Action Plan
Mitigation Category: Property Protection
Responsible Office: MWS Stormwater Division
Priority (H, M, L): Medium
Cost Estimate: $5,000 for 2-day on-site course for staff
Community Benefit: Reduce losses, complaints, and staff time in responding to complaints
Potential funding: Existing Budget; TEMA
Schedule: 2005

RECOMMENDED ACTION 13:

The CPT determined that severe weather hazard mitigation actions and coordination would be best addressed under the goal of public awareness.

The severe weather hazards of drought and wildfire, extreme temperatures, thunderstorms and high winds, tornadoes; and winter storms are recommended to be included in a multi-hazard, seasonal Public Awareness Program.

RECOMMENDED ACTION 14:

Communities that participate in the National Flood Insurance Program (NFIP) often have difficulty determining whether structures meet the NFIP definition of being substantially damaged. This is particularly true after a major flood or other disaster in which large numbers of buildings have suffered damage and there is a pressing need to provide damage determinations so that reconstruction can begin. Structures in Special Flood Hazard Areas that are substantially damaged must be brought into compliance with the minimum requirements of that local ordinances and the NFIP. To assist communities in making such determinations, FEMA developed the Residential Substantial Damage Estimator (RSDE) software, which provides guidance in estimating building value and damage costs for both single family and manufactured homes. Based on the regulatory requirements of the NFIP, it is intended to be used in conjunction with industry-accepted residential cost estimating guides.

It is recommended that Metro personnel participate in training in the use of the RSDE program.

Source:	CPT
Mitigation Category:	Property Protection
Responsible Office:	OEM
Priority (H, M, L):	Low
Cost Estimate:	$5,000 for 2-day on-site course for staff
Community Benefit:	Improved enforcement of substantial damage regulations; mitigated structures; increased eligibility for ICC (increased cost of compliance)
Potential funding:	Existing Budget; TEMA
Schedule:	2005

GOAL #2: Promote awareness of hazards and vulnerability among citizens, business, industry and government.

Objective 2.1: Develop a seasonal multi-hazard public education campaign to be implemented annually.

RECOMMENDED ACTION 15:

Develop and conduct a multi-hazard, seasonal Public Awareness Program that provides citizens and businesses with accurate information describing the risk and vulnerability to natural hazards, and is implemented on an annual basis.

Metro is subject to several natural hazards, each which poses a different degree of risk and associated vulnerability. Some hazards have a combination of attributes, including a high likelihood of occurrence, a specific location that are likely to be affected, and proven approaches that can reduce the impact; therefore the CPT has recommended that specific actions be taken in regards to these hazards. For other hazards, where either the likelihood of occurrence is very low, or the area of likely impact cannot be specified, or there is very little that can be done to reduce the impacts of the hazard, the CPT has determined that the best approach would simply be public awareness. An educational program for the community should include information describing historical events and losses, the likelihood of future occurrences, the range of possible impacts, appropriate actions citizens can take to save lives and minimize property damage, and resources for additional information. Any information provided through this effort should be accurate, specific, timely, and consistent with current and accepted local emergency management procedures as promoted by the Tennessee State Emergency Management Agency (TEMA), the Mayor's Office of Emergency Management, the CRS Public Outreach (Activity 330), and the American Red Cross.

In order to implement a Public Awareness Program, the following actions are recommended:

- Establish a Public Information Committee with the responsibility for developing a Public Awareness Program highlighting the following topics:
    - Wind mitigation techniques such as safe rooms, securing of roofs and foundations, and strengthening garage doors;
    - Information on geological hazards including landslide and sinkhole risk areas;
    - Information on flood hazards and flood insurance; and
    - Winter storm tips including driving and emergency preparedness kits.

- Use a variety of information outlets including local news media, distribution of brochures and leaflets, water bill inserts, websites, and public service announcements. Current brochures and flyers should be put on display in Metro office buildings, libraries, and other public places. In addition, information should be linked to billing e-payments.

- Develop public-private partnerships and incentives to support public education activities, including displaying hazard models at schools, OEM, NWS, Home Depot, Lowes, Homebuilder shows, Realtor organizations, and other events and locations.

- Investigate opportunities to cooperate with the Greater Nashville Association of Realtors in preparing the public information program strategy. Possibilities include developing a real estate agents' brochure or a process whereby real estate agents disclose hazard information to potential property purchasers, for example through the MLS listing services

- Continue all public information activities currently taking place. Review effectiveness and revise accordingly.

Source:	CPT and Community Rating System Action Plan
Mitigation Category:	Public Information
Responsible Office:	MWS; OEM; Chamber of Commerce; Realtor Board
Priority (H, M, L):	High
Cost Estimate:	$5-20,000, depending upon printing and mailing costs, level of volunteer participation, and scope and frequency of events.
Community Benefit:	Life-Safety, Relatively Low Cost, Multi-Hazard program is efficient, relies upon work already accomplished by CPT and others.
Potential funding:	5% state set aside from future HMGP funding and PDM funds
Schedule	Part of a seasonal multi-hazard public awareness campaign

RECOMMENDED ACTION 16:

MWS Stormwater Division currently sends an annual mailing to the approximate 10,000 properties located within the 100-year floodplain.

It is recommended that MWS Stormwater Division continue the mailing and that the mailing be modified to include other natural hazards of concern that have been identified through the hazard mitigation planning process.

Source:	Community Rating System Action Plan
Mitigation Category:	Public Information
Responsible Office:	MWS Stormwater Division
Priority (H, M, L):	Medium
Cost Estimate:	Staff time is required to produce and review approximately 10,000 individual digital pamphlets. The pamphlets must be printed, folded, sealed, and posted in accordance with US Postal Service requirements. Assume one week of staff time in addition to approximately $5,000 in printing and postage costs.
Community Benefit:	CRS Credit is provided for sending a notice to at least 90% of the properties in the floodplain. The notice must be distributed to all properties of the SFHA and those additional areas known to have

flooding problems. The notice must clearly explain that the recipient's property is subject to flooding with a phrase such as "your property is in or near the floodplain." Reduced losses to taxpayer by increasing flood insurance coverage and prompting protection measures undertaken by building-owners.

Potential funding: Existing Budget
Schedule: Annually

RECOMMENDED ACTION 17:

CRS credit is provided if elevation certificate data is available on a website that is readily accessible to any inquirer (e.g., no payment of money is needed). This can be in the form of a searchable database, scanned elevation certificates, or any other format that makes the data available. Additionally, the relatively low setup cost would be more than paid for by the reduced staff time needed to retrieve elevation certificate data and answer questions from inquirers. By referring people to the website, staff would be free to handle technical issues and permit reviews.

Discussions should be held with Metro website staff on the best way to post Elevation Certificate data on the website and procedures to maintain the data.

Source: CPT and Community Rating System Action Plan
Mitigation Category: Public Information
Responsible Office: MWS Stormwater Division
Priority (H, M, L): Low
Cost Estimate: Staff Time
Community Benefit: Public Information
Potential funding: Existing Budget
Schedule: 2005

RECOMMENDED ACTION 18:

Due to the historically perceived threat of nuclear attack, fallout shelters have been designed and constructed throughout the Metro area.

The CPT recommends completing an inventory of these existing shelters and utilizing them as "tornado safe" places and shelters. The inventory should be published community access.

Source: CPT
Mitigation Category: Public Information
Responsible Office: OEM
Priority (H, M, L): Low
Cost Estimate: Staff Time
Community Benefit: Life Safety
Potential funding: Existing Budget; TEMA
Schedule: 2005

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GOAL #3: Maximize use of available funding.

Objective 3.1: Identify multiple objective opportunities that can be used to support mitigation activities.
Objective 3.2: Identify and analyze project cost share options.
Objective 3.3: Submit mitigation project applications annually at a minimum.

RECOMMENDED ACTION 19:

A flood threat recognition system tells emergency management officials that a flood is coming. Examples of creditable systems include river stage predictions from the National Weather Service and using local gages to predict flood crests and times.

The Mayor's Office of Emergency Management, with help from the MWS Stormwater Division's engineers, should review the costs and benefits of developing flood crest prediction programs for other streams with reporting gages.

Documentation for CRS credit will be needed for the existing threat predictions on the Cumberland and Harpeth Rivers. There are more rain and river gages on smaller streams that are monitored, but additional work would be needed to translate readings into a crest prediction. These gages include Mill Creek at Antioch, Browns Creek at the State Fairgrounds, and Whites Creek at Bordeaux.

Source:	Community Rating System Action Plan
Mitigation Category:	Emergency Services
Responsible Office:	OEM in conjunction with MWS Stormwater Division
Priority (H, M, L):	Medium
Cost Estimate:	One half (½) day of staff time for documentation of the Cumberland and Harpeth River gages; $10,000 to develop crest prediction programs for other streams. Additionally there is an existing cost of $165,000 for current monitoring efforts. This cost is shared equally by Metro and the USGS.
Community Benefit:	Public Safety
Potential funding:	NWS; USGS; HMGP, FMA
Schedule:	Within 5 years

RECOMMENDED ACTION 20:

Tennessee's Safe Dams Program does not receive any CRS credit because it does not meet the minimum CRS requirements. The CRS credit criteria is based on a model program developed by the Association of State Dam Safety officials. It calls for the state agency to have the ability to regulate all high and significant hazard dams.

Tennessee state law exempts "farm ponds" from state regulations. The Tennessee Department of Environment and Conservation reports that of the 1,100 dams in the state, over 500 qualify as farm ponds, i.e., any privately owned dam that is not open to the public.

There are 16 such farm pond dams in Davidson County, 8 of which are considered "high hazard." "High hazard" means that their failure would likely kill or injure someone. Since 1973, 37 dams in Tennessee have failed, of which 33 were unregulated.

Metro officials should talk to their state legislators and Tennessee Department of Environment and Conservation staff about the feasibility of amending the state's dam safety laws.

Source:	Community Rating System Action Plan
Mitigation Category:	Emergency Services
Responsible Office:	MWS and OEM
Priority (H, M, L):	Low
Cost Estimate:	Staff Time; Because changing a state law involves political contacts and discussions, a cost for technical staff time or consultant expenses cannot be estimated. It would take one to two days to prepare a background paper on the issues.
Community Benefit:	Public Safety
Potential funding:	Existing Budget
Schedule:	Within 5 years

RECOMMENDED ACTION 21:

Cooperating Technical Partners (CTPs) are communities, regional agencies, or states that have the interest and capability to be active partners in FEMA's flood mapping program. CTPs enter into an agreement that formalizes their contribution and commitment to flood mapping. The objective of the program is to maximize limited funding by combining resources and help maintain consistent national standards.

Metro's Stormwater Division should pursue a Cooperating Technical Partner agreement with FEMA in order to gain CRS credit and to get its mapping standards to better fit local conditions or make the community a higher priority for mapping support.

Source:	Community Rating System Action Plan
Mitigation Category:	Property Protection
Responsible Office:	MWS Stormwater Division
Priority (H, M, L):	Low
Cost Estimate:	Staff Time
Community Benefit:	CRS credit is provided if Metro signs a Cooperating Technical Partner (CTP) agreement with FEMA. Cooperating Technical Partners agree to contribute to floodplain mapping.
Potential funding:	Existing Budget
Schedule:	2005

RECOMMENDED ACTION 22:

Develop a financial strategy to design and construct large capital improvement projects.

The strategy shall incorporate a cost-sharing plan to leverage local, state, and federal funding for stormwater management activities and projects.

Source:	Floodplain Management Plan
Mitigation Category:	Structural Projects
Responsible Office:	MWS Stormwater Division
Priority (H, M, L):	Low
Cost Estimate:	$40,000
Community Benefit:	Life Safety
Potential funding:	Existing Budget; TEMA
Schedule:	2005

RECOMMENDED ACTION 23:

FEMA offers two programs, the Hazard Mitigation Grant Program (HMGP) and the Flood Mitigation Assistance (FMA) Program, to assist local communities with reducing future losses of lives and properties due to disasters. The HMGP provides grants to local communities to implement long-term hazard mitigation measures such as the elevation, acquisition, or relocation of flood-prone structures after a major disaster declaration. The FMA program provides grants to communities for projects that reduce the risk of flood damage to structures that have flood insurance coverage. FEMA's mitigation grant programs are administered by the TEMA, which prioritizes and selects project applications developed and submitted by local jurisdictions.

The CPT recommends applying annually for potentially available HMGP and FMA grants.

Source:	CPT
Mitigation Category:	Structural Projects
Responsible Office:	MWS and OEM
Priority (H, M, L):	Low
Cost Estimate:	Staff Time to complete grant application
Community Benefit:	Potential funding sources for action items of this Mitigation Plan
Potential funding:	Existing Budget
Schedule:	Annually

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COMPLETED ACTION ITEMS

Recommended mitigation action items from several existing community plans have already been implemented by Metro. This demonstrates not only the current capability of Metro to counter identified hazards through existing policies, regulations, programs, and procedures, but also the ongoing commitment of Metro to protect the community and mitigate the damaging effects of hazards. Completed action items are presented below.

COMPLETED ACTION 1:

Develop a plan and schedule to modify and enhance the existing floodplain management regulations with the intent of minimizing future flooding within the floodplain.

Source: Floodplain Management Plan
Responsible Office: MWS Stormwater Division
Status: A Stormwater Regulation Review Committee (SWR2C) has been formed to advise Metro Water Services (MWS) and consultant team on revisions and enhancements to stormwater management regulations and associated processes.

COMPLETED ACTION 2:

Develop formalized policies (level-of-service and extent-of-service) for maintenance of the stormwater drainage system.

Source: Floodplain Management Plan and Community Rating System Action Plan
Responsible Office: MWS Stormwater Division
Status: Draft policies addressing level-of-service and extent-of-service have been prepared in order to define the areas where maintenance work will be preformed by MWS Stormwater Division staff.

COMPLETED ACTION 3:

Develop a GIS database of all stormwater detention structures and BMP facilities within Metro Nashville and Davidson County. Upon completion of database, develop a routine maintenance schedule to ensure proper detention and water quality functions of stormwater facilities.

Source: Floodplain Management Plan
Responsible Office: MWS Stormwater Division
Status: The GIS database was completed in 2003 based upon the available data through 2002. A maintenance schedule using the GIS database was initiated in June of 2004. The MWS Stormwater Division Maintenance Staff estimate that they inspect 100 stormwater structures each month. The inspection program is performed in conjunction with system maintenance for documentation purposes.

COMPLETED ACTION 4:

Double the number of stormwater infrastructure maintenance crews (four to eight) that handle maintenance problems and dedicate appropriate equipment to perform maintenance.

Source: Floodplain Management Plan
Responsible Office: MWS Stormwater Division
Status: The MWS Stormwater Division currently employs eight maintenance crews. The crews are assigned to large ditch maintenance, stormwater inlet construction, stormwater inlet cleanout, and masonry.

COMPLETED ACTION 5:

Metro should begin a practice to place deed restrictions on all flood-prone lands purchased with public funds.

Source: Community Rating System Action Plan
Responsible Office: MWS Stormwater Division
Status: Deed restrictions were revised and/or placed on all floodprone lands purchased with public funds during 2004 as a part of the CRS annual review and update.

COMPLETED ACTION 6:

Metro Nashville's Emergency Operations Center (EOC) is co-located with the 911 center, which also houses police and fire/EMS communications divisions. Because the EOC is co-located and is not a stand-alone facility, Metro lacks redundancy for direction and control, emergency communications, and 911 service in the event that this facility becomes unusable.

Source: OEM Local Hazard Mitigation Plan
Responsible Office: OEM
Status: As an alternative to constructing a new EOC facility, an audit performed in 2001 stated that the primary need was for an alternate Emergency Communications Center (ECC). OEM collaborated with E-911 officials to fully equip a second site as a backup for the primary ECC, which remains at the existing EOC location. Initial planning such as siting potential locations and earmarking capital improvements funding are underway so that a new, state-of-the-art primary emergency communications center can be built for Metro.

COMPLETED ACTION 7:

Develop GIS database of insurable structures within the designated floodplain, particularly including the repetitive loss areas. The database shall contain detailed structure elevation and floodplain data.

Source: Floodplain Management Plan
Responsible Office: MWS Stormwater Division
Status: Developed for the repetitive loss homeowner mailouts, a database of parcels and structures located in the floodplain has been linked to existing elevation certificate information. This information is provided to all homeowners located in the floodplain on an

annual basis. Approximately 10,000 homeowners currently receive a residence-specific mailout.

COMPLETED ACTION 8:

Initiate a multi-year comprehensive watershed study for Mill Creek, the largest watershed in Davidson County, Mill Creek. Repetitive loss areas are identified on Mill Creek mainstem and two tributaries, Sevenmile Creek and Whittemore Branch. The watershed study will identify flooding problems and develop capital improvement projects to remedy flooding problems.

Source: Floodplain Management Plan
Responsible Office: MWS Stormwater Division
Status: The US Army Corps Of Engineers, Nashville District, in conjunction with AMEC, will complete floodplain inundation mapping and floodway analysis for the following streams in the Mill Creek Watershed: Mill Creek, Sevenmile Creek, Sorghum Branch, Whittemore Branch, Sims Branch, Tributary A, Tributary B, Collins Creek, Turkey Creek, Indian Creek, and Holt Creek. The watershed study will be the first study to utilize new HEC software, HEC-HMS version 3.0. The 107 square mile watershed is subdivided into 129 subwatersheds that are further broken down into 200 meter grids (10 acres). Each grid is defined with unique parameters, such as impervious surface area, loss rates, and landuse, that have been derived by existing Metro GIS data. Newly developed GIS tools will use watershed management practices for stormwater and planning purposes.

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Multi-Hazard Mitigation Plan

6.0 Plan Adoption

44 CFR 201.6(c)(5): "{The local hazard mitigation plan shall include} documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g.,City Council, County Commissioner, Tribal Council)."

Metro Council will adopt the Multi-Hazard Mitigation Plan by passing the resolution set forth below. The Council's resolution also creates the Community Planning Team. The Stormwater Regulation Review Committee was also formed by resolution. The executed copy of this adopted committee resolution is included in Appendix A. The adoption of this resolution completes Step 9 of the Plan Development Process: Formal Plan Adoption.

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Multi-Hazard Mitigation Plan

7.0 Plan Implementation and Maintenance

44 CFR 201.6(c)(4): "{The plan maintenance process shall include a} section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle."

IMPLEMENTATION

Step 10 of the Plan Development Process: Implementation and Maintenance of the Plan is critical to the overall success of Hazard Mitigation Planning. Upon adoption, the plan faces the truest test of its worth: implementation. Implementation implies two closely related concepts: action and priority.

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While this plan recommends many worthwhile and "High" priority actions, the decision about which action to undertake first will be the first issue that the CPT faces. Fortunately, there are two factors that will help the CPT make that decision, items that have been prioritized during planning and funding. Thus, pursuing low or no-cost high-priority recommendations will have the greatest likelihood of being the first steps.

Another important implementation mechanism that is highly effective but low-cost, is to take steps to incorporate both the recommendations and the underlying principles of this Hazard Mitigation Plan into other community plans and mechanisms, such as Comprehensive Planning, Capital Improvement budgeting, Economic Development goals and incentives, or regional plans such as those put forth by the State Department of Transportation. Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The best chance for the plan's success is if CPT staff and elected officials maintain a vigilance to incorporate the plan into operations. This integration is accomplished by a constant, prevailing, and energetic effort to network among programs and to identify and highlight the multi-objective, "win-win" benefits for each affected program, as well as the communities and constituents. This effort is achieved through the mundane actions of monitoring agendas, attending meetings, sending memos, and promoting safe, sustainable communities.

In concert with these efforts, it is important to maintain constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how any required local match or participation requirement can be met. Then, when funding does become available, the CPT will be in a position to capitalize upon the opportunity. Funding opportunities that can be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal ear-marked funds, and grant programs, including those that can serve or support multi-objective applications.

With the adoption of this plan, the CPT should be converted to a permanent advisory body referred to as the Mitigation Coordinating Committee. This Committee, led by OEM, should agree to commit to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of the high priority, low/no-cost Recommended Actions;
- Keep the concept of mitigation in the forefront of community decision-making by identifying recommendations of this plan when other community goals, plans and activities overlap, influence, or directly affect community vulnerability to disasters;
- Maintain vigilant monitoring of multi-objective cost-share opportunities to assist the community in implementing the Recommended Actions of this plan for which no current funding or support exists;
- Monitor implementation of this Plan;
- Report on progress and recommended changes to the Metro Council; and
- Inform and solicit input from the public.

The Committee will not have any powers over Metro staff; it will be an advisory body only. Its primary duty is to see that the Plan is carried out successfully and to report to the Metro Council and the public on the status of Plan implementation and mitigation opportunities in Nashville and Davidson County. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to the appropriate entities, and posting relevant information on the Metro website.

MAINTENANCE

Plan maintenance implies an ongoing effort to monitor and evaluate the implementation of the plan, and to update the plan as progress, roadblocks, or changing circumstances are recognized.

This monitoring and updating will take place through a semi-annual review by OEM, an annual review through the standing CPT or Mitigation Coordinating Committee, and a 5-year written update to be submitted to the state and FEMA Region IV, unless disaster or other circumstances (e.g., changing regulations) lead to a different time frame. CRS requires an annual re-certification report.

When the Committee reconvenes for the review they will coordinate with all of the stakeholders that participated in the planning process – or that have joined the Committee since the inception of the planning process – to update and revise the plan. Public notice will be given and public participation will be invited, at a minimum, through available webpostings and press releases to the local media outlets, primarily newspapers and AM radio stations.

The evaluation of the progress can be achieved by monitoring changes in the degree of vulnerability identified in the plan. Changes in vulnerability can be identified by noting:

- Lessened vulnerability as a result of implementing Recommended Actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or,
- Increased vulnerability as a result of new development (and/or annexation).

The plan will be updated via written changes and submissions, as the Committee deems appropriate and necessary, and as approved by the Metro Council.

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